



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In the Patent Application of

Hideo YAMANAKA et al.

Serial No. **09/646,680**

Filed: September 20, 2000

Art Unit: **1762**

Examiner: E. Fuller

For: FILM FORMING METHOD AND FILM FORMING APPARATUS

APPEAL BRIEF

**BOX AF**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

This is an Appeal Brief under Rule 192 appealing the final decision of the Examiner dated October 23, 2002 (Paper No. 11). Each of the topics required by Rule 192 is presented herewith and is labeled appropriately.

I. Real Party In Interest

Sony Corporation of Tokyo, Japan ("Sony") is the real party in interest of the present application. An assignment of all rights in the present application to Sony was executed by the inventor and recorded by the U.S. Patent and Trademark Office at **reel 011468, frame 0426.**

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## **II. Related Appeals And Interferences**

There are no appeals or interferences related to the present application of which Appellant is aware.

## **III. Status of Claims**

Claims 1-45 were originally filed in this application.

Claims 3-7, 10-13, 15, 18, 19, and 22-45 were withdrawn by the Examiner in the Office Action of Paper No. 7, mailed on March 27, 2002.

Thus, the Appellant hereby appeals the final rejection of claims 1-2, 8-9, 14, 16-17 and 20-21 which are presented in the Appendix.

## **IV. Status of Amendments**

No Amendment after Final Rejection has been filed

### **V. Summary of the Invention**

This invention relates to a film forming method and a film forming apparatus for vapor growth of a predetermined film made of polycrystal silicon or the like.

Within the claimed invention, a reaction gas 40 is brought into contact with a heated catalyzer 46 and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species (page 21, lines 1-4), thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base 1.

### **VI. References of Record**

In the final rejection of October 23, 2002, the Examiner relied upon:

U.S. Patent No. 6,225,241, Miyoshi.

U.S. Patent No. 4,668,365, Foster.

U.S. Patent No. 6,291,343, Teng et al. (Teng).

U.S. Patent No. 5,900,161 issued to Doi.

U.S. Patent No. 3,769,670 issued to Schrank.

### VII. Issues

The issues presented for consideration in this appeal are as follows:

Whether the Examiner erred in rejecting claims 1, 2, 16, 17 and 20 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster.

Whether the Examiner erred in rejecting claims 8 and 9 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Teng.

Whether the Examiner erred in rejecting claim 14 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Doi.

Whether the Examiner erred in rejecting claim 21 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Schrank.

These issues will be discussed hereinbelow.

#### **VIII. Grouping of Claims**

For purposes of the issues presented by this appeal:

Claims 1, 20 stand or fall together.

Claim 2 stands or falls alone.

Claims 8-9 stand or fall together.

Claim 14 stands or falls alone

Claim 16 stands or falls alone

Claim 17 stands or falls alone

Claim 21 stands or falls alone.

The arguments set forth in the following section provide reasons why these groups are considered separately patentable, 37 C.F.R. 1.192 (c) (7).

#### **IX. Arguments**

In the Final Office Action of October 23, 2002:

The Examiner rejected claims 1, 2, 16, 17 and 20 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view

of Foster.

The Examiner rejected claims 8 and 9 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Teng.

The Examiner rejected claim 14 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Doi.

The Examiner rejected claim 21 under 35 U.S.C. §103 as being allegedly obvious over Miyoshi in view of Foster and in further view of Schrank.

For at least the following reasons, Appellant submits that these rejections are both technically and legally unsound and should therefore be reversed.

#### Decision on Petition

While a Petition is normally not the subject matter for appeal, the Petition Under 37 C.F.R. §1.144 filed on July 29, 2002 and the Decision on Petition mailed as Paper No. 13 on

November 27, 2002 are being addressed herein for the purpose of completeness because of their relevancy to the issues on appeal.

The above-identified application is a national stage application filed under 35 U.S.C. §371. Thus, unity of invention, not restriction practice, is applicable. M.P.E.P. §1893.03(d), 8<sup>th</sup> Edition, August 2001.

The Office Action mailed as Paper No. 7 on March 27, 2002 maintained the restriction requirement made within the Office Action of Paper No. 5, mailed on December 21, 2001, and included an examination only of claims 1-2, 8-9, 14, 16-17 and 20-21, which are the subject of this appeal. The remaining Group I claims 3-7, 10-13, 15, 18, 19 and 22 along with Group II claims 23-45 were restricted and withdrawn by the Examiner as non-elected inventions.

In response to the Petition Under 37 C.F.R. §1.144 that challenged the propriety of the restriction requirement, the Decision on Petition mailed on July 25, 2002 as Paper No. 15 denied the Petition by holding that the film forming method and apparatus (claims 1 and 23) had been shown not to make a

contribution over Miyoshi and Foster, and by further holding that the Examiner's finding of lack of unity of invention was correct as a result.

Within the Office Action of Paper No. 11, mailed on October 23, 2002, the Examiner concedes that the film forming method and apparatus share technical features with each other. And as shown hereinbelow, the film forming method and apparatus, indeed, makes a contribution over the cited prior art (including Miyoshi and Foster), thus warranting an allowance of claims 3-7, 10-13, 15, 18, 19 and 22-45 previously withdrawn from consideration, along with an allowance of the finally rejected claims 1-2, 8-9, 14, 16-17 and 20-21.

- - - If prosecution is reopened upon consideration of this appeal and a new ground of rejection entered, M.P.E.P. §1208.02, rejoinder of the invention contained within non-examined claims 3-7, 10-13, 15, 18, 19 and 22-45 with the invention contained within examined claims 1-2, 8-9, 14, 16-17 and 20-21 is respectfully requested.

General Matters

M.P.E.P. 707.07(f) states that "the importance of answering such arguments is illustrated by *In re Herrmann*, 261 F.2d 598, 120 USPQ 182 (CCPA 1958) where the applicant urged that the subject matter claimed produced new and useful results. The court noted that since applicant's statement of advantages was not questioned by the examiner or the Board of Appeals, it was constrained to accept the statement at face value and therefore found certain claims to be allowable. See also *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed Cir. 1995) (Office failed to rebut applicant's argument)."

Obviousness, generally

As a rule, "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, *absent some teaching suggestion or incentive supporting the combination*" (*emphasis added*). *In re Geiger*, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) (obviousness rejection reversed due to lack of teaching suggestion or incentive to support the examiner's combination).

**THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2, 16, 17 AND 20**  
**UNDER 35 U.S.C. §103 AS BEING ALLEGEDLY OBVIOUS OVER**  
**MIYOSHI IN VIEW OF FOSTER.**

This rejection is traversed at least for the following reasons.

**CLAIMS 1, 20**

Claim 1 and the claims dependent thereon are drawn to a film forming method in which a reaction gas is brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base.

The Office Action **admits that Miyoshi fails to disclose, teach or suggest the claimed electric field.** Thus, Miyoshi fails to disclose, teach or suggest a reaction gas brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage. The Office Action cites Foster for the features deficient within Miyoshi.

Note, there is no teaching within Miyoshi or Foster that the apparatus of Foster is suitable for performing the process of Miyoshi. Specifically, there is no teaching within Miyoshi or Foster that the apparatus of Foster is suitable for performing the catalytic CVD process of Miyoshi. For example, note that while Miyoshi arguably teaches a catalytic method, further note that a catalyzer is NON-EXISTENT within Foster. As such, proper motivation as to why the skilled artisan would have combined the teachings of Foster and Miyoshi is not found within the cited prior art.

Moreover, Foster fails to disclose, teach or suggest an electric field of not higher than a glow discharge starting voltage. Nevertheless, to provide for this deficiency within Foster, the Office Action "interprets" low DC bias with Foster as the claimed electric field. Specifically, the Office Action interprets low DC bias within Foster as a voltage that is below the glow discharge starting voltage. There is no teachings within the cited prior art to that would lead the skilled artisan to this conclusion. Any other interpretation of Foster is mere hindsight.

For example, while Foster arguably teaches a heater 52 for heating a cathode body 34 (column 6, lines 42-43), while Foster arguably teaches that low DC bias and the resulting relatively low-energy ion bombardment result in low substrate and film defect densities (column 8, lines 32-34), and while figure 9 of Foster arguably depicts curve 91 of DC bias as a function of magnetic field (column 8, lines 35-36), there is **no teaching within Foster** of the relationship between a low DC bias and a voltage that is below the glow discharge starting voltage, as "interpreted" within the Office Action.

In this regard, the Office Action impermissibly benefits from of the specification to make the necessary changes in Foster. "It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps. The references themselves must provide some teaching whereby the applicant's combination would have been obvious" (citations omitted). *In re Gorman*, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). See also *In re Dembiczak*, 50 USPQ2d

1614, 1616 (Fed. Cir. 1999) (rejection based upon hindsight is reversed).

In addition, this assertion amounts to nothing more than an "obvious-to-try" situation. Specifically, "an 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued." *In re Eli Lilly & Co.*, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990). Moreover, "an invention is 'obvious to try' where the prior art gives either no indication of which parameters are critical or no direction as to which of many possible choices is likely to be successful." *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 10 USPQ2d 1843, 1845 (Fed. Cir. 1989).

Here, Foster does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued. "Obvious to try" is

not the standard under §103. *In re O'Farrell*, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988).

As a result, Miyoshi and Foster, either individually or as a whole, fail to disclose, teach or suggest a reaction gas brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage.

**CLAIM 2**

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 2, a DC voltage not higher than the glow discharge starting voltage is applied to direct the reactive species toward the base.

However, direct the reactive species toward the base using DC voltage not higher than the glow discharge starting voltage is not found within Miyoshi and Foster, either individually or as a whole.

**CLAIM 16**

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 16, the catalyzer is heated to a temperature within a range of 800 to 2000°C and lower than its melting point, and the reactive species, produced by catalytic reaction or thermal decomposition of at least a part of the reaction gas with the heated catalyzer, are used as material species so as to deposit a thin film by a thermal CVD method on the base heated to the room temperature to 550°C.

However, Miyoshi and Foster, either individually or as a whole, fail to disclose, teach or suggest heated catalyzer and the reactive species used as material species so as to deposit a thin film by a thermal CVD method on the base heated to the room temperature to 550°C. Specifically, the base heated to the room temperature to 550°C is not found within Miyoshi and Foster.

**CLAIM 17**

In addition to the reasons provided hereinabove with regard to claims 1 and 16, this rejection is traversed at least for the following reasons.

Within claim 17, the catalyzer is heated by its own resistance heating.

In addition, the Office Action admits that Miyoshi does not teach a catalyzer heated by its own resistance heating. But the Office Action asserts, without providing supporting evidence, that "to heat the tungsten by resistance heating would have been obvious at the time the invention was made to a person having ordinary skill in the art with a reasonable expectation of success. By doing so, the apparatus used in the process is made simpler."

However, this unsupported assertion amounts to nothing more than conclusions that are personal in nature. Nevertheless, the teachings, suggestions or incentives supporting the obviousness-type rejection must be clear and particular. Broad conclusory

statements, standing alone, are not evidence. *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

As a rule, "assertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given, in the Patent Office, the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference." (Citations omitted). *In re Pardo and Landau*, 214 USPQ 673, 677 (CCPA 1982). The support must have existed at the time the claimed invention was made. *In re Merck & Co., Inc.*, 231 USPQ 375, 379 (Fed. Cir. 1986).

"Allegations concerning specific 'knowledge' of the prior art, which might be peculiar to a particular art should also be supported and the appellant similarly given the opportunity to make a challenge." (Citations omitted). *In re Pardo and Landau*, 214 USPQ 673, 677 (CCPA 1982).

In addition, "it is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from

references to fill the gaps. The references themselves must provide some teaching whereby the applicant's combination would have been obvious" (citations omitted). *In re Gorman*, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). See also *In re Dembiczak*, 50 USPQ2d 1614, 1616 (Fed. Cir. 1999) (rejection based upon hindsight is reversed).

Moreover, the procedures established by Title 37 of the Code of Federal Regulations expressly entitle the Applicant to an Examiner's affidavit upon request. Specifically, "when a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible, and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons." 37 C.F.R. 1.104(d)(2).

Also note that the failure to provide any objective evidence to support the challenged use of Official Notice constitutes **clear and reversible error**. *Ex parte Natale*, 11 USPQ2d 1222, 1227-1228 (Bd. Pat. App. & Int. 1989).

Accordingly, Applicant hereby requests a reference or an Examiner's affidavit to support this officially noticed position of obviousness or what is well known. Further note that if this reference or Examiner's affidavit is not provided, the assertions of what is well known **must be withdrawn**. See M.P.E.P. 2144.03.

In addition, this assertion amounts to nothing more than an "obvious-to-try" situation. Specifically, "an 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued." *In re Eli Lilly & Co.*, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990). Moreover, "an invention is 'obvious to try' where the prior art gives either no indication of which parameters are critical or no direction as to which of many possible choices is likely to be successful." *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 10 USPQ2d 1843, 1845 (Fed. Cir. 1989).

Here, Miyoshi does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued. "Obvious to try" is not the standard under §103. *In re O'Farrell*, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988).

**THE EXAMINER ERRED IN REJECTING CLAIMS 8 AND 9 UNDER 35**

**U.S.C. §103 AS BEING ALLEGEDLY OBVIOUS OVER MIYOSHI IN  
VIEW OF FOSTER AND IN FURTHER VIEW OF TENG.**

This rejection is traversed at least for the following reasons.

**CLAIMS 8, 9**

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claims 8 and 9, the catalyzer is arranged between the base and an electrode for applying the electric field.

However, Miyoshi and Foster, either individually or as a whole, fail to disclose, teach or suggest a catalyzer arranged between the base and an electrode for applying the electric field. The Office Action cites Tseng for the features deficient within Miyoshi and Foster.

Note, there is no teaching within Miyoshi, Foster or Teng that the apparatus of Teng is suitable for performing the process of Miyoshi and Foster.

Specifically, there is no teaching within Miyoshi, Foster or Teng that the apparatus of Teng is suitable for performing the catalytic CVD process of Miyoshi. For example, note that a catalyzer is nonexistent within Teng.

In addition, the Office Action contends that "having the electrode also be the gas inlet port would result in the same benefit of accelerating the ion for the possible amount of time." But this contention amounts to an unsupported opinion and is not evidence of obviousness.

As such, proper motivation to combine the teachings of Miyoshi, Foster and Teng is absent.

In addition, Tseng fails to disclose, teach or suggest a catalyzer arranged between the base and an electrode for applying the electric field. Instead, Tseng arguably teaches a plasma 181 between base 132 and electrode 134 (figure 3).

Thus, Miyoshi, Foster and Tseng, either individually or as a whole, fail to disclose, teach or suggest the claimed invention.

**THE EXAMINER ERRED IN REJECTING CLAIM 14 UNDER 35 U.S.C.**

**\$103 AS BEING ALLEGEDLY OBVIOUS OVER MIYOSHI IN VIEW OF**

**FOSTER AND IN FURTHER VIEW OF DOI.**

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 14, after vapor growth of the predetermined film, the base is taken out of a deposition chamber and a voltage

is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

The Office Action cites Doi for the features deficient within Miyoshi and Foster. Note, there is no teaching within Miyoshi, Foster or Doi that the apparatus of Doi is suitable for performing the process of Miyoshi and Foster. Specifically, there is no teaching within Miyoshi, Foster or Doi that the apparatus of Doi is suitable for performing the catalytic CVD process of Miyoshi. For example, note that a catalyzer is nonexistent within Doi. As such, proper motivation to combine the teachings of Miyoshi, Foster and Doi is absent.

In addition, Doi fails to disclose, teach or suggest, after vapor growth of the predetermined film, the base is taken out of a deposition chamber and a voltage is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

As a result, Miyoshi, Foster and Doi, either individually or as a whole, fail to disclose, teach or suggest the claimed invention.

**THE EXAMINER ERRED IN REJECTING CLAIM 21 UNDER 35 U.S.C.**

**\$103 AS BEING ALLEGEDLY OBVIOUS OVER MIYOSHI IN VIEW OF  
FOSTER AND IN FURTHER VIEW OF SCHRANK.**

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 21, the catalyzer is heated in a hydrogen-based gas atmosphere before supplying the material gas.

The Office Action cites Shrank for the features deficient within Miyoshi and Foster. Note, there is no teaching within Miyoshi, Foster or Shrank that the method of Shrank is suitable for performing the process of Miyoshi and Foster. Specifically, there is no teaching within Miyoshi, Foster or Shrank that the method of Shrank is suitable for performing the catalytic CVD

process of Miyoshi. For example, note that a catalyzer is nonexistent within Shrank. As such, proper motivation to combine the teachings of Miyoshi, Foster and Shrank is absent.

In addition, Shrank arguably teaches a process of manufacturing tungsten filaments for an incandescent lamp (claim 1), and arguably teaches that this treatment increases the life of an incandescent lamp (column 1, lines 41-43). Thus, there is no teaching in the cited prior as to why the skilled artisan in the chemical vapor deposition art would have looked to the incandescent light art, and specifically to Shrank, for the features deficient within Miyoshi and Foster.

As a result, Miyoshi, Foster and Shrank, either individually or as a whole, fail to disclose, teach or suggest a reaction gas brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage.

#### **X. Conclusion**

Maki fails to disclose fail to disclose, teach or suggest at least the above-noted features of the claimed invention at the

time the invention was made, and therefore, does not render Applicant's invention obvious.

Thus, the claims are considered allowable for the same reasons discussed above, as well as for the additional features they recite, and particularly in light of the cited prior art.


In view of the foregoing, it is submitted that the final rejection of claims 1-2, 8-9, 14, 16-17 and 20-21 is improper and should not be sustained.

Therefore, a reversal of the Final Rejection of October 23, 2002 as to claims 1-2, 8-9, 14, 16-17 and 20-21 is respectfully requested.

Respectfully submitted,

DATE: March 24, 2003

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XI. APPENDIX

Claims on Appeal

1. A film forming method in which a reaction gas is brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base.

2. The film forming method as claimed in claim 1, wherein a DC voltage not higher than the glow discharge starting voltage is applied to direct the reactive species toward the base.

8. The film forming method as claimed in claim 1, wherein the catalyzer is arranged between the base and an electrode for applying the electric field.

9. The film forming method as claimed in claim 8, wherein a gas supply port for leading out the reaction gas is formed in the electrode.

14. The film forming method as claimed in claim 1, wherein after vapor growth of the predetermined film, the base is taken out of a deposition chamber and a voltage is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

16. The film forming method as claimed in claim 1, wherein the catalyzer is heated to a temperature within a range of 800 to 2000°C and lower than its melting point, and the reactive species, produced by catalytic reaction or thermal decomposition of at least a part of the reaction gas with the heated catalyzer, are used as material species so as to deposit a thin film by a thermal CVD method on the base heated to the room temperature to 550°C.

17. The film forming method as claimed in claim 16, wherein the catalyzer is heated by its own resistance heating.

20. The film forming method as claimed in claim 1, wherein the catalyzer is made of at least one type of material selected from the group consisting of tungsten, thorium-containing

tungsten, titanium, molybdenum, platinum, palladium, vanadium, silicon, alumina, ceramics with metal adhered thereto, and silicon carbide.

21. The film forming method as claimed in claim 1, wherein the catalyzer is heated in a hydrogen-based gas atmosphere before supplying the material gas.